

REMARKS

By this Amendment, claims 1, 5 and 9 have been amended. Claims 1-11 are pending in the application. Reconsideration and allowance are respectfully requested in light of the following remarks.

Rejection Under 35 U.S.C. § 102

Claims 1, 3, 4 and 9 were rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 6,103,619 to Lai et al. ("Lai"). The rejection is respectfully traversed.

Claim 1, as amended, recites a method for forming a stepped profile from a layer sequence in which: a) in a first patterning step, a first layer partial sequence, which is at least partially covered by a photoresist layer, is removed apart from a first residual layer partial sequence, b) in a second patterning step, a second layer partial sequence located below the first layer partial sequence is partially removed by means of etching with a second etchant, c) in a third patterning step, a third layer partial sequence located below the second layer partial sequence is partially removed by means of etching with a third etchant, wherein: d) in the second patterning step, a region of the second layer partial sequence that is located below the first residual layer partial sequence is removed, by which a first projection of the first residual layer partial sequence being formed, and e) in the third patterning step, the first projection of the first residual layer partial sequence is removed, wherein the photoresist layer remains during the first, second and third patterning steps (emphasis added).

Support for the amendments to claim 1 is found in Figures 1 to 4. Figure 1 shows a starting structure including photoresist layer 3 disposed on a first layer

partial sequence 21, second layer partial sequence 22 located below the first layer partial sequence 21, and third layer partial sequence 23 located below second layer partial sequence 22. Figure 2 depicts the structure resulting from the first patterning step; Figure 3 depicts the structure resulting from the second patterning step; and Figure 4 depicts the structure resulting from the third patterning step.

As shown in Figures 1 and 2, in the first patterning step, the first layer partial sequence 21 is removed apart from a first residual layer partial sequence 211. In the second patterning step, a region of the second layer partial sequence 22 located below the first residual layer partial sequence 211 is removed, by which a first projection A of the first residual layer partial sequence is formed. See Figure 3. In the third patterning step, the first projection A of the first residual layer partial sequence is removed.

As shown in Figures 2 to 4, photoresist layer 3, remains during the first, second and third patterning steps. The photoresist layer 3 is removed after these patterning steps have been performed as shown in Figure 5. See page 7, lines 1-2, of the specification. See claim 9. Advantageously, embodiments of the claimed method for forming a stepped profile from a layer sequence can achieve high accuracy because the photoresist layer remains during all of the recited patterning steps, allowing the method to be performed with less process steps.

Lai does not disclose a method comprising every feature of the method recited in claim 1. Figures 8 to 13 of Lai show a process of forming a dual damascene structure on a wafer. As shown in Figure 8 of Lai, a first photoresist layer 68 is formed on inter layer dielectric (ILD) 66. As shown in Figure 9, the first photoresist layer 68 is removed after hole 72 is formed in ILD 66 (first patterning

step). Lai at column 4, lines 1-8. Then, wet etching is performed (second patterning step). See Figure 10 of Lai. A second photoresist layer 76 is formed on ILD 66 (Figure 11) to then form the structure shown in Figures 12 and 13 by a second dry etching process (third patterning step). Lai at column 4, lines 22-33. Thus, Lai's process does not utilize a photoresist layer (i.e., the same photoresist layer) that remains during all patterning steps. As such, Lai does not anticipate the method recited in claim 1.

As described at page 2, lines 4-14, of the specification (and in view of Lai), when between one or more patterning steps further photoresist layers (masks) are applied and which then must be removed, the overall process becomes increasingly inaccurate due to orientation problems that occur when positioning the exposure masks. These additional process steps decrease process efficiency and accuracy. Lai does not suggest modifying its disclosed process to result in the process recited in claim 1, including using the same photoresist layer during all patterning steps. As such, Lai also would not have rendered obvious the claimed method. Thus, claim 1 is patentable over Lai.

Claims 3, 4 and 9, which depend from claim 1, are also patentable over Lai for at least the same reasons as those for which claim 1 is patentable. Therefore, withdrawal of the rejection is respectfully requested.

Rejections Under 35 U.S.C. § 103

A. Claim 2 were rejected under 35 U.S.C. § 103(a) over Lai in view of U.S. Patent No. 6,297,161 to Sah ("Sah"). The rejection is respectfully traversed.

Sah has been applied in the rejection for allegedly curing the deficiencies of Lai with respect to the method recited in claim 2, which depends from claim 1. Applicants submit that Sah fails to provide the required suggestion or motivation to modify Lai to result in the method recited in claim 1. Therefore, withdrawal of the rejection is respectfully requested.

B. Claim 5 were rejected under 35 U.S.C. § 103 over Lai in view of U.S. Patent No. 6,156,662 to Ohori et al. ("Ohori"). The rejection is respectfully traversed.

Ohori has been applied in the rejection for allegedly curing the deficiencies of Lai with respect to the method recited in claim 5, which depends from claim 1. Applicants submit that Ohori fails to provide a suggestion or motivation to modify Lai to result in the method recited in claim 1. Therefore, withdrawal of the rejection of claim 5 is respectfully requested.

C. Claim 6 was rejected under 35 U.S.C. § 103(a) over Lai in view of U.S. Patent No. 3,663,184 to Wood et al. ("Wood"). The rejection is respectfully traversed.

Wood has been applied for allegedly curing the deficiencies of Lai with respect to the method recited in claim 6, which depends from claim 1. Applicants submit that Wood fails to provide a suggestion or motivation to modify Lai to result in the method recited in claim 1. Therefore, withdrawal of the rejection of claim 6 is respectfully requested.

D. Claims 7 and 10 were rejected under 35 U.S.C. § 103(a) over Lai in view of U.S. Patent No. 5,200,351 to Hadjizadeh-Amini. ("Hadjizadeh-Amini"). The rejection is respectfully traversed.

Hadjizadeh-Amini has been applied for allegedly curing the deficiencies of Lai with respect to the method recited in claims 7 and 10, which depend from claim 1. Applicants submit that Hadjizadeh-Amini fails to provide a suggestion or motivation to modify Lai to result in the method recited in claim 1. Therefore, withdrawal of the rejection of claims 7 and 10 is respectfully requested.

E. Claim 8 was rejected under 35 U.S.C. § 103(a) over Lai in view of U.S. Patent Application Publication No. 2001/0006246 to Kwag et al. ("Kwag"). The rejection is respectfully traversed.

Kwag has been applied for allegedly curing the deficiencies of Lai with respect to the method recited in claim 1, which depends from claim 1. Applicants submit that Kwag fails to provide a suggestion or motivation to modify Lai to result in the method recited in claim 1. Therefore, withdrawal of the rejection of claim 8 is respectfully requested.

F. Claim 11 was rejected under 35 U.S.C. § 103(a) over Lai in view of Kwag, and further in view of U.S. Patent No. 5,296,093 to Swejkowski ("Swejkowski"). The rejection is respectfully traversed.

Swejkowski has been applied for allegedly curing the deficiencies of Lai and Kwag with respect to the method recited in claim 11, which depends from claim 1. Applicants submit that Swejkowski fails to provide a suggestion or motivation to

modify Lai to result in the method recited in claim 1. Therefore, withdrawal of the rejection of claim 11 is respectfully requested.

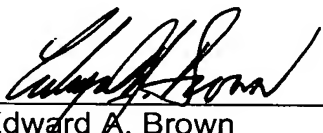
Conclusion

Therefore, allowance of the application is respectfully requested. If the Examiner has any questions concerning this reply or the application in general, the undersigned can be reached at the number given below.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

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